Korchia J, Freeman KP. Total observable error, total allowable error, and QC rules for canine serum and urine cortisol achievable with the Immulite 2000 Xpi cortisol immunoassay

Supplemental Tables 1, 2. Results from canine serum[1] and canine urine[2] cortisol validation studies, used in our study: QC rule validation by the classical approach (Fig. 2A) for 2 cortisol concentrations (L4 = 38.6 nmol/L [1.4 µg/dL]; L8 = 552 nmol/L [20 µg/dL]) and both QCM levels in canine serum and canine urine.

We investigated the sigma metric and the candidate QC rules at "low" TEa and "high" TEa (see materials and methods). The goal was to illustrate the large influence of varying TEa on candidate QC rules. Similarly, we investigated the candidate QC rules at "low" P_{ed} (arbitrarily chosen at 50%, even if such a low P_{ed} is undesirable) and at "high" P_{ed} (chosen at the minimum level of 90%). The goal was to illustrate the limited influence of varying P_{ed} on candidate QC rules. **Bold** QC rules are those newly accepted when moving from high to low P_{ed} and/or from low to high TEa.

Table abbreviations: AB = average bias; All = includes all 4 QC rules (1_{2s}, $1_{2.5s}$, 1_{3s}, $1_{3s}/2_{2s}/R_{4s}$); L4 = cortisol concentration of 38.6 nmol/L (1.4 µg/dL); L8 = cortisol concentration of 552 nmol/L (20 µg/dL); P_{ed} = probability of error detection (by the QCM); QCM = quality control material; RB = range-based bias; SR = spiking-recovery bias; TEa = total allowable error; TEo = observed total error.

Supplemental Table 1. QC rule validation by the classical approach in canine serum cortisol.

Serum cortisol	High P$_{ed}$ (P$_{ed}$90%)					Low P$_{ed}$ (P$_{ed}$50%)				
Low TEa	Level	TEo (%)	TEa (%)	σ	Candidate QC rule	Level	TEo (%)	TEa (%)	σ	Candidate QC rule
	L4$_{(SR)}$	25.6	33	2.8	None	L4$_{(SR)}$	25.6	33	2.8	None
	L4$_{(RB)}$	32.8	33	2.0	None	L4$_{(RB)}$	32.8	33	2.0	None
	L4$_{(AB)}$	22.0	33	3.2	None	L4$_{(AB)}$	22.0	33	3.2	**1_{2s}**
	L8$_{(SR)}$	17.9	20	2.3	None	L8$_{(SR)}$	17.9	20	2.3	None
	L8$_{(RB)}$	19.3	20	2.1	None	L8$_{(RB)}$	19.3	20	2.1	None
	L8$_{(AB)}$	17.8	20	2.3	None	L8$_{(AB)}$	17.8	20	2.3	None
	QCM1	8.5	20	4.8	1_{2s}, $1_{2.5s}$, $1_{3s}/2_{2s}/R_{4s}$	QCM1	8.5	20	4.8	**All**
	QCM2	14.5	20	2.8	None	QCM2	14.5	20	2.8	None
High TEa	Level	TEo (%)	TEa (%)	σ	Candidate QC rule	Level	TEo (%)	TEa (%)	σ	Candidate QC rule
	L4$_{(SR)}$	25.6	50	4.6	**1_{2s}**	L4$_{(SR)}$	25.6	50	4.6	1_{2s}; **$1_{2.5s}$;$1_{3s}/2_{2s}/R_{4s}$; 1_{3s}**
	L4$_{(RB)}$	32.8	50	3.8	None	L4$_{(RB)}$	32.8	50	3.8	**1_{2s}, $1_{2.5s}$**
	L4$_{(AB)}$	22.0	50	4.9	**1_{2s}; $1_{2.5s}$; $1_{3s}/2_{2s}/R_{4s}$**	L4$_{(AB)}$	22.0	50	4.9	**All**
	L8$_{(SR)}$	17.9	50	6.3	**All**	L8$_{(SR)}$	17.9	50	6.3	All
	L8$_{(RB)}$	19.3	50	6.1	**All**	L8$_{(RB)}$	19.3	50	6.1	All
	L8$_{(AB)}$	17.8	50	6.3	**All**	L8$_{(AB)}$	17.8	50	6.3	All
	QCM1	8.5	50	12.1	**All**	QCM1	8.5	50	12.1	All
	QCM2	14.5	50	7.1	**All**	QCM2	14.5	50	7.1	All

Supplemental Table 2. QC rule validation by the classical approach in canine urine cortisol.

Urine cortisol	High P_{ed} (P_{ed}90%)					Low P_{ed} (P_{ed}50%)				
Low TEa	Level	TEo (%)	TEa (%)	σ	Candidate QC rule	Level	TEo (%)	TEa (%)	σ	Candidate QC rule
	L4$_{(SR)}$	61.4	61.4	2	None	L4$_{(SR)}$	61.4	61.4	2	None
	L4$_{(RB)}$	27.8	33	2.5	None	L4$_{(RB)}$	27.8	33	2.5	None
	L4$_{(AB)}$	20.2	33	3.3	None	L4$_{(AB)}$	20.2	33	3.3	**1_{2s}**
	L8$_{(SR)}$	28.9	28.9	2	None	L8$_{(SR)}$	28.9	28.9	2	None
	L8$_{(RB)}$	19.9	20	2.0	None	L8$_{(RB)}$	19.9	20	2.0	None
	L8$_{(AB)}$	10.3	20	4.1	1_{2s}	L8$_{(AB)}$	10.3	20	4.1	1_{2s}, **$1_{2.5s}$, 1_{3s}/2_{2s}/R$_{4s}$, 1_{3s}**
	QCM1$_{(SR)}$	46.6	46.6	2	None	QCM1$_{(SR)}$	46.6	46.6	2	None
	QCM1$_{(RB)}$	19.5	20	2.1	None	QCM1$_{(RB)}$	19.5	20	2.1	None
	QCM1$_{(AB)}$	11.9	20	3.5	None	QCM1$_{(AB)}$	11.9	20	3.5	**1_{2s}, $1_{2.5s}$**
	QCM2$_{(SR)}$	28.7	28.7	2	None	QCM2$_{(SR)}$	28.7	28.7	2	None
	QCM2$_{(RB)}$	19.7	20	2.1	None	QCM2$_{(RB)}$	19.7	20	2.1	None
	QCM2$_{(AB)}$	10.1	20	4.2	1_{2s}	QCM2$_{(AB)}$	10.1	20	4.2	1_{2s}, **$1_{2.5s}$, 1_{3s}/2_{2s}/R$_{4s}$, 1_{3s}**
High TEa	Level	TEo (%)	TEa (%)	σ	Candidate QC rule	Level	TEo (%)	TEa (%)	σ	Candidate QC rule
	L4$_{(SR)}$	61.4	61.4	2	None	L4$_{(SR)}$	61.4	61.4	2	None
	L4$_{(RB)}$	27.8	50	4.3	**1_{2s}**	L4$_{(RB)}$	27.8	50	4.3	1_{2s}, **$1_{2.5s}$, 1_{3s}/2_{2s}/R$_{4s}$, 1_{3s}**
	L4$_{(AB)}$	20.2	50	5.1	**1_{2s}, $1_{2.5s}$, 1_{3s}/2_{2s}/R$_{4s}$**	L4$_{(AB)}$	20.2	50	5.1	**All**
	L8$_{(SR)}$	28.9	50	6.6	**All**	L8$_{(SR)}$	28.9	50	6.6	All
	L8$_{(RB)}$	19.9	50	8.5	**All**	L8$_{(RB)}$	19.9	50	8.5	All
	L8$_{(AB)}$	10.3	50	10.6	**All**	L8$_{(AB)}$	10.3	50	10.6	All
	QCM1$_{(SR)}$	46.6	50	2.6	None	QCM1$_{(SR)}$	46.6	50	2.6	None
	QCM1$_{(RB)}$	19.5	50	7.6	**All**	QCM1$_{(RB)}$	19.5	50	7.6	All

QCM1(AB)	11.9	50	9.1	**All**	QCM1(AB)	11.9	50	9.1	All
QCM2(SR)	28.7	50	6.7	**All**	QCM2(SR)	28.7	50	6.7	All
QCM2(RB)	19.7	50	8.7	**All**	QCM2(RB)	19.7	50	8.7	All
QCM2(AB)	10.1	50	10.9	**All**	QCM2(AB)	10.1	50	10.9	All

References

1. Korchia J, Freeman KP. Validation study of canine serum cortisol measurement with the Immulite 2000 Xpi cortisol immunoassay.

   J Vet Diagn Invest 2021;33:844–863.

2. Korchia J, Freeman KP. Validation study of canine urine cortisol measurement with the Immulite 2000 Xpi cortisol immunoassay. J

   Vet Diagn Invest 2021;33:1052–1068.